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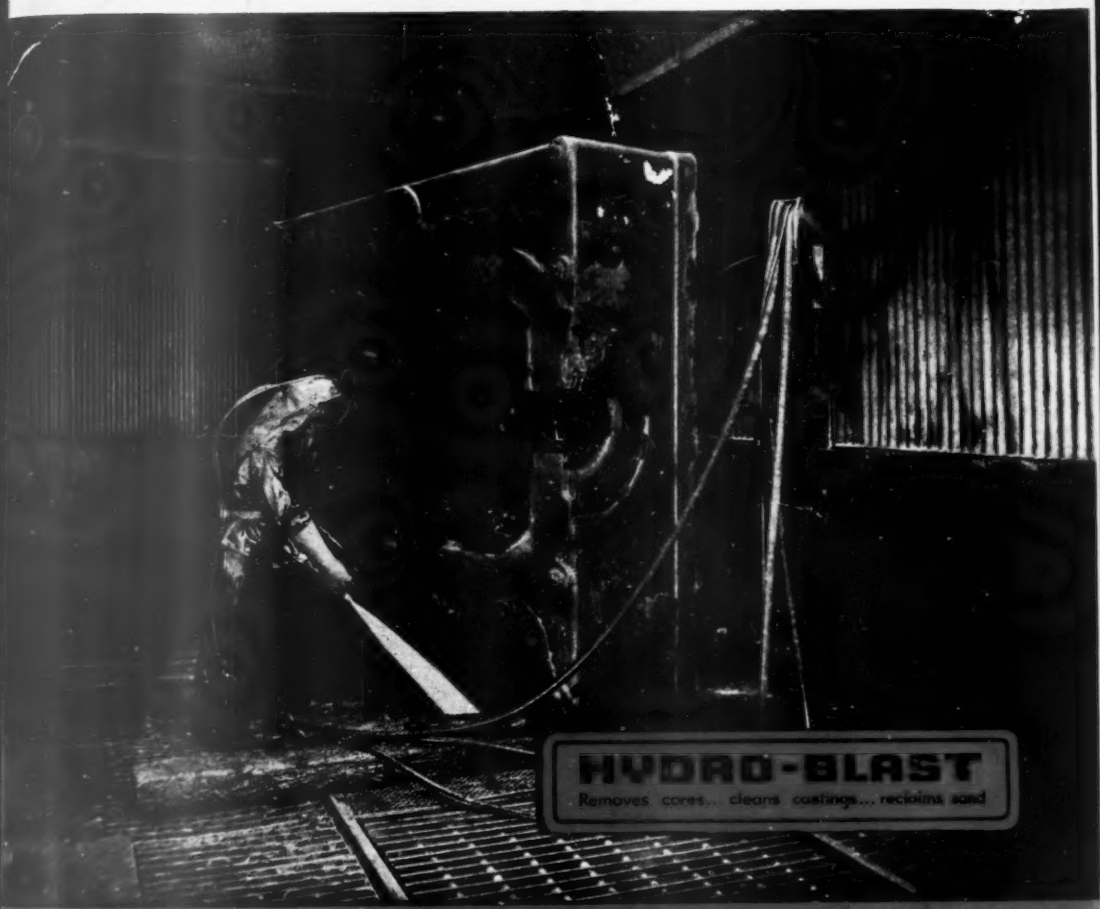

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Conditions in Iron Foundries*

Last week's publication bearing the above title is the first report of the Joint Standing Committee on Conditions in Iron Foundries, which was set up as a continuation of the "Garrett Report" committee. It covers eight years' work, most of which has already been brought to the attention of the industry through papers given before the technical institutes or communications emanating from the research associations. During this period, a vast amount of research and practical work has been undertaken in co-operation with the Committee, and the results obtained are abstracted in 16 appendices to the Report. For some obscure reason, the medical investigations have been embodied in the Report itself, though logic would indicate that they, like the others, should have been printed as an appendix.

The major part of the Report is devoted to the dust-and-fume hazard or foundry atmospheres. Only four pages, and appendix XVI (which analyses the accidents occurring in 1953), have been devoted to accident prevention. Yet during the period reviewed by the Committee, there has been a noteworthy and commendable reduction of accidents. Like other machinery, foundry plant has to be provided with guards by the manufacturers. This can be the minimum or the maximum, and, due to the exercise of discretion by local factory inspectors wide variables are encountered. As a result, there is obviously an impact on the manufacturing cost of items carrying guards and we think the time has arrived when the Factory Department should accord, where applicable, some form of approval of guards supplied with foundry machines; at the moment the position is chaotic. This is the type of question we should have liked to have seen dealt with in the Report, as it would represent a step forward in overall foundry safety.

The Report's conclusions, essentially elementary in character, are generally applicable and are all the better for that reason. There are but five lines of action suggested, yet we insist that through their enthusiastic application by all concerned there would be a dramatic decrease in foundry accidents. The recommendations include such important items as good housekeeping; the provision of better protective equipment and its proper care and use by the workmen; early first-aid treatment (and here we would add upkeep of the First Aid Cabinets in immaculate condition); better instruction on safe methods and practices, with special attention being paid to weight lifting (here we have noted with pleasure the better physical condition of foundry recruits nowadays, as compared with those just after the war) and, finally, the institution of joint safety committees for the mutual discussion of ways and means of reducing accidents.

* Report published by Her Majesty's Stationery Office, price 4/6 net.

Notes from the Branches

East Anglia

Fog conditions prevented many members who travel considerable distances from attending the January meeting of the East Anglian section of the London branch of the Institute of British Foundrymen. In view of such circumstances, however, the attendance was very satisfactory. Mr. W. J. Driscoll, a member of the technical sub-committee T.S. 43, presented its report entitled "Cupola Development," making it clear that although the first report was issued approximately 1½ years ago, the sub-committee was still a very active one and data which have since been accumulated were now nearing the stage of presentation. Comparative data for hot- and cold-blast installations were then presented by means of slides, mainly as they appeared in the original report.

During the discussion, MR. V. W. CHILD said that there was no doubt that the report presented indisputable facts, but it was important to appreciate that the maximum benefits from the various effects of hot blast could not be realized all at the same time, and that one should not try to achieve too much at once. Mr. Child added that much of the data given could be substantiated by users of hot-blast installations and it was not surprising to hear that many more plants were being installed.

MR. DRISCOLL said that the duration of a melt could be considerably extended especially when water-cooling was applied. Many installations in this country and abroad operated continuously for 16 hours or more.

Desirable Lining Thickness

MR. CATES asked whether internal water-cooling was worth installing on a cold-blast cupola and what thickness of lining would be desirable.

In his reply, MR. DRISCOLL stated that with this type of cooling the melting-zone diameter remained more constant from the beginning to the end of the melt with the result that the melting conditions were more uniform. It was still not fully agreed how far and under what conditions this method of cooling could be employed without undue loss of metal temperature. No form of water-cooling was fully effective unless the lining was relatively thin, say 3-in. or less, and the optimum thickness was normally found by experience. With such thin linings it was, of course, imperative that the water flow was maintained and alternative supplies or duplicate pumps might be necessary.

MR. WARD was interested to know how long it took to recover the initial installation cost of a hot-blast plant suitable for a cupola melting approximately 30 tons of grey iron per day.

MR. DRISCOLL pointed out that this depended of course on whether a 4-tons per hour installation was operated for 8 hours, or an 8-tons per hour plant for 4 hours. As with any production tool involving capital expenditure, the cost was recovered more quickly the more hours it was in use. On the other hand, small hot-blast cupola installations were rather more expensive in relation to their size than large ones, as some components—instruments, for instance—were of much the same cost irrespective of plant size. When melting 30-tons per day over 8 hours it was quite reasonable to say that the initial expenditure would be recovered within 2 to 2½ years, while an even shorter period might be expected under some circumstances.

In proposing a vote of thanks to Mr. Driscoll, MR. CHILD said the report had been well studied by cupola personnel. It was a report which should be well borne in mind, as it dealt with the equipment used to supply metal for the foundry. Mr. Driscoll had presented very clearly the substance of the report and such facts enabled one to assess that an installation was well worth consideration when the melting rate was 4- to 5-tons per hour, or more.

Wales and Monmouth

A meeting of the West Wales section of the Wales and Monmouth branch was held at Llanelly on January 27, when Mr. R. W. Ruddle presented a Paper on the "Running and Feeding of Castings," to which some new material had been added so as to include aspects of this subject that have aroused interest since the Paper was first presented. In the discussion, questions were asked regarding the statement that when using step-gates practically all the metals flows through the bottom gate; some members were not convinced on this point. The cost of applying these ideal running methods was the subject of other questions, and the lecturer emphasized that the cost was justified where the type of material or the service requirements of the casting made it an economical proposition.

Southampton

NEARLY 200 attended a recent meeting of the Southampton section of the London branch of the Institute of British Foundrymen, the number being swollen by attendance from the local technical college. Both teachers and students from the college were invited, and the subject—a technical film show: "A Story of Copper" and "The 'Yorkshire' Point of View"—provided the basis for a most interesting discussion amongst members and visitors.

IBF National Works Visit Day 1956

This year, the day which members of the Institute of British Foundrymen are invited on a countrywide basis to spend a day visiting works in a specified area has been fixed for Friday, October 5. The Lancashire branch of the Institute will be hosts on that occasion and will organize a series of visits in that area. An informal dinner is usually held the same evening.

Latest Foundry Statistics

According to the Ministry of Supply, the output of aluminium castings during November last was 1,960 tons from sand moulds, 4,642 tons as gravity-die- and 1,679 tons as pressure-die-castings. The 11 months production in these three branches was 19,843; 46,501; and 16,353 tons respectively. The output of magnesium castings during November was 439 tons.

German Steel Records

Last month Germany set up a new record for monthly steel output. January output reached 1,944,000 tons, compared with 1,779,000 tons in December and 1,627,000 tons in January last year. An average daily production of 70,680 tons last month showed an increase of 13 per cent. over the same month last year.

Owing to a continuance of the dispute in the printing industry, this issue of the JOURNAL is below normal size and apologies are again tendered to readers and advertisers

Leyland's New Shot-blasting Plant

Mechanisation Eliminates a Cleaning "Bottleneck"

Designated as a mechanical "firing squad," an automatically operated shot-blasting plant, in which the streams of chilled iron shot are "fired" into a chamber lined with rubber and thick steel plate, has just been installed in the Farington foundry of Leyland Motors Limited at a cost of £25,000. Its purpose is to mechanize the cleaning of iron and steel castings, thus avoiding any "bottlenecks" which might arise due to increasing foundry production. Output has been boosted considerably in recent months, both to meet the demands of increased vehicle output at the Leyland factories and to meet orders for castings from manufacturers such as Rover, Jaguar and Rolls Royce.

As with other plant installed under the company's policy of increased mechanization for the foundry, this latest equipment has resulted in a saving in man/hours and in improved working conditions. It has a capacity of up to 100 castings per hour.

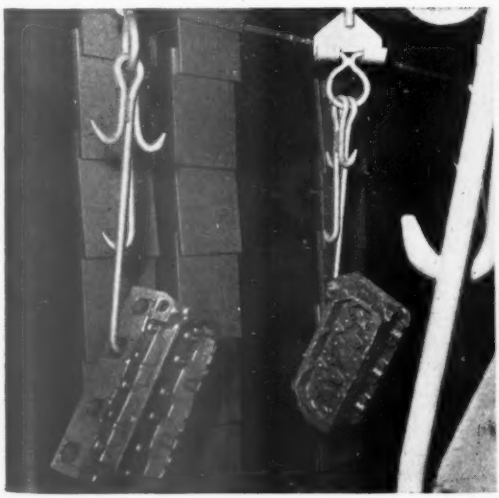
Operational Sequence

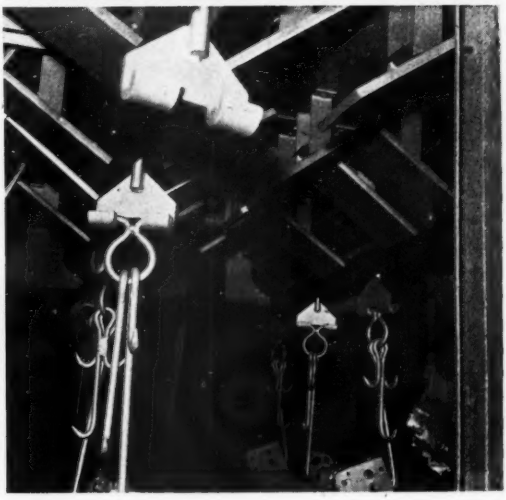
The plant is manned by a team of three, as against the eight men previously required for this work. The first member of the team attaches the stressed-relieved castings to specially-designed slings (Fig. 1) which are suspended from an overhead chain conveyor, 139-ft. long. This carries the castings through a cleaning chamber at a speed which can be varied from two to eight ft. per min.

As each carrier enters the chamber, a sprocket-wheel on the carrier engages with an endless roller chain driven in the opposite direction. This rotates the castings as they pass in front of the "firing squad"—four units which spray jets of the chilled-iron shot abrasive at extremely high velocity from various angles on to the castings to clean them. These four "Wheelabrator" units are spaced in the wall of the chamber, each being driven by a 20 b.h.p. electric motor. The spent shot falls through the perforated steel floor of the chamber into hoppers below, where it is screened before being returned to the units.

The second member of the team operates a pneumatic shot-blasting "spotting" cabinet near the exit, examining each casting through an observation window in the wall of the cabinet. By individually

FIG. 1.—*Stress relieved castings passing in front of the four "Wheelabrator" units spaced in the wall of the chamber of Leyland's new cleaning plant. Details of the steel-plate protection incorporated into the side and roof of the blasting chamber are shown in Figs.* 2 *and* 3. *below*





Leylands New Shot-blasting Plant

blasting all awkward corners and pockets in the castings, he ensures that each casting is thoroughly cleaned before being unloaded by the third man, prior to being transferred to the fettling department.

Dust-laden air from the cleaning chamber and abrasive discharge points is extracted by a 30-in. exhaust fan having a displacement capacity of 11,200 cub. ft. per min. and collected in a steel-chamber arrestor where fabric tubes are used to separate the dust from the air. The arrestor is mounted on a platform 9 ft. above ground level so as to enable trucks to draw underneath and collect the dust, which is discharged through three hoppers.

The entire operation is push-button controlled from a panel equipped with power-factor correction mechanism. Tilghmans Limited, of Altrincham, manufactured the plant, the conveyor and turning unit being constructed by Bagshawe & Company Limited, of Dunstable.

Value of Notch Tensile Test

A HISTORY of the development at Cambridge of a notch tensile test for the investigation of brittleness in structural mild-steel is described by Prof. J. F. Baker, and Dr. C. F. Tipper, in a paper entitled "The Value of the Notch Tensile Test," presented to the Institution of Mechanical Engineers. The test procedure and the methods of assessing the temperature limit at which the material becomes brittle are outlined, reference being made to investigations of material from an oil storage tank and from ships which fractured in service showing that this notch tensile test gives good correlation with these casualties whatever the nominal stress in the plates at the time of the fracture. The results of Charpy V-notch and Izod tests are given for comparison, and it is shown that the energy absorption criterion used in these tests may be misleading. Experiments are described in which the tensile test has been used to predict performance in test-pieces of more complicated geometric form. Criticisms of the notch tensile test are dealt with, while in their conclusions, the authors draw attention to the fact that the designer of orthodox fabricated structures must be provided with material which is ductile at all operating temperatures and at all stress levels.

Notch Effects on Design

The designer of a fabricated structure, it is pointed out, is not comforted by the information that a brittle fracture would not propagate so long as the working stresses did not exceed some limit. Every designer is now aware that the stress distribution deduced from his approximate design calculations is very different from that which really exists. Whether welding or riveting is used, high stresses will always occur even under low loads. Were a designer forced to use a material which was susceptible to brittle fracture when the nominal stress exceeded some value, he would have to change the form of his design radically. It would be impossible to use relatively thin load-bearing plates as in ships

(*Continued foot of column* 2)

and storage tanks. Efforts to remove the gross defects of design and welding technique, which were responsible for many of the earlier ship casualties, state the authors, have reduced their number. The complete collapse of two oil-storage tanks and the development of cracks during construction in other steel structures, however, show that the risk is not past.

Control Points in Steelworks Overhead Cranes

Importance of Convenient Layout

IN the last decade, two branches of study, machine design and technological development on the one hand, and the study of man's behaviour and his inherent capacities on the other, have been brought together in an attempt to clarify and define man's relationship with the machines and tools he uses, states BISRA summary No. 83, on the design of control points in steel works, with particular reference to electric overhead cranes. The layout of the controllers and control point in relation both to the operator and the mechanism being controlled is important. It is, of course, desirable that an operator should see his working point during an operation. The layout of the control point should be such that the most important controllers and those most frequently used are the most readily accessible. Furthermore, all controls should be within easy reach of the smallest operator likely to be employed. Control handles should move in the "expected" direction. Thus, a lever controlling a hoisting motion should be arranged so that the handle is pulled towards the operator for lifting, and pushed away from the body for lowering. Wherever possible, handles controlling travel motions should move in the direction of travel. Controls should be readily distinguishable one from another. Coding by colour, size, and shape all provide means of helping the operator in this connection.

The practical requirements of controls in steelworks is being studied. The number of notches required on a controller is being investigated in an attempt to reduce the bulk of the controller body and so to improve access to the control point and visibility from it. Another means of improving both these aspects of design is by developing suitable mechanical remote-control apparatus, so that switchgear can be placed away from the control levers.

All operators, whether in cranes, mill pulpits, or other control points, should, if they are working for long periods without pause, be provided with satisfactory seats. Much information on body dimensions has been collected by universities and Service departments and it is now possible to design seats which provide support suitable for nearly all men but which have a minimum of adjustments. Such a seat has been manufactured for use in the steel industry, but has yet to be given extended trials.

Progress with the CO_2 Process in British Foundries*

Discussion of Mr. A. Tipper's Paper

Most of the question time when this Paper was presented in London was concerned with points of detail in practical application of the CO_2 Process. Amongst these were enquiries on surface finish, sand reclamation, health hazards, knock-out properties, gas supply, contamination of system sand, and milling requirements. Other speakers contributed details of their own experience of the Process and there was quite a lengthy discussion of the relative cooling power of CO_2-bonded sand.

At a meeting of the London branch of the Institute of British Foundrymen held in London earlier this session, Mr. V. C. Faulkner (a past-president of the Institute and of the London branch) took the chair in the absence of the branch president, Mr. F. Hudson, F.I.M.

Introducing Mr. A. Tipper, M.SC., who was to present his Paper on "Progress of the CO_2 Process in British Foundries," MR. FAULKNER expressed his pleasure in introducing his 'young and old' friend, Mr. Tipper, a man for whom he had the utmost admiration. By evening study Mr. Tipper had gained the degree of M.Sc. of London University; that took some doing and was a great credit to him. He had worked in the foundry industry for a long time and was very well known as a lecturer. At one time he was associated with Mr. F. Hudson, the branch president. He was an expert on the science of sand testing and had had a very wide experience in foundries in this country.

MR. TIPPER said how much he appreciated Mr. Faulkner's remarks and the fact that he was presiding on that occasion. In presenting his Paper, he first discussed the development of the CO_2 Process, its purpose and the results of its application; then, a film entitled "Gasbond in Foundryland" made by his company was shown, illustrating the Process in four different foundries in this country and finally Mr. Tipper summed up and put forward some ideas on the future of the process.

Three Points

MR. J. G. MCDONNELL, opening the discussion, asked the following questions:—(1) Was as good a surface finish obtained on castings as with conventional methods? (2) Could the sand be reclaimed after use and, if so, what methods and expense were involved? (3) Did the process involve any health hazard from the point of view of silicosis, particularly when stripping moulds at the knock-out?

MR. TIPPER assured Mr. McDonnell that the CO_2 Process certainly gave steel castings a better finish than did some of the conventional processes. He had seen castings made side by side by the Randupson and CO_2 Process and there was no doubt which was the better. On the other hand, when speaking of small castings, the finish obtained with CO_2 sand was not quite so good as when oil-bonded sand was used. With dry-sand moulds, the finish was neither better nor worse.

As to reclamation of sand, Mr. Tipper recalled his earlier statement that this was an expensive process unless one had adequate space in which to deposit used sand and in perhaps 10 or 15 years the sand would be suitable for use again. The answer was to use new sand. Where the sand supply was cheap, obviously one would not be bothered with reclamation, so that his advice at the moment was always to use new sand as a facing.

So far as the materials were concerned, he was not aware of any health hazard. Naturally the Factory Inspectors and medical officers of the Ministry of Labour were taking a very keen interest in the Process and would report if any trouble arose. His own practical experience of the situation at the knock-out was that there were less fumes and certainly there was no more dust than with the normal foundry sands.

Other Experiences

MR. G. J. ROGERS said he had been studying the Process very deeply and had had experience of it for some months, so he felt that he could speak with some sort of authority. He advised anyone using the CO_2 Process—which he considered to represent one of the greatest revolutions in the foundry industry—always to have the corebox drilled through from the outside and to inject the gas from the outside, for an air lock must be avoided at all costs. In that way, one obtained efficient gassing. Obviously, when sand was rammed in the box, if the gas were driven down through the centre it displaced the air and pressed it against the side of the box, and particularly in pockets of sand; it could be appreciated how difficult it was then to avoid an air lock. If one did not do something about it, there would be a soft place, with resultant trouble. A light rapping of the corebox also assisted the displaced air to escape.

No one should attempt to use patterns or coreboxes without proper dressing. Shellac was unsuitable; a cellulose-type dressing was recommended. By the use of a clear varnish, one could get a pretty good result but much better was the cellulose dressing.

Discussing a statement that the cores should not be left in a green-sand mould for more than two hours, he said that only that morning he had seen cores for a bedplate being put into a green-sand mould of considerable size; it would not be cast until the following day, and this represented the normal practice. One company had a job with a core about 15-in. long, 1-ft. wide and 6-in. deep.

*Paper printed in the JOURNAL, February 2. The Author is associated with Harborough Construction Company, Limited.

which was fastened into the top, and it might stay there from Friday morning until, perhaps, the following Wednesday, before casting. He had never experienced any trouble from dampness; or had he had any trouble with scabbing or blowing.

For clean stripping of sand from a casting, he had found that a dressing of ordinary blacking mixed with a little binder, of the molasses type, and dried with a gas torch, gave excellent results. Finally, he asked Mr. Tipper what was a good mixture to use in the light-castings industry for giving a good knock-out, plus a core which would not crack a thin aluminium casting.

MR. TIPPER suggested that a mixture of between 2 and 3 per cent. of binder in silica sand—nothing else—would be adequate.

MR. ROGERS said he had been using 1 per cent. by weight of wood-flour, which gave pretty good results, but he asked if there were anything better.

MR. TIPPER replied that in most cases he had found wood-flour to be unnecessary. He would agree that on occasions it would make a good knock-out even better, but one did not get so satisfactory a core. For a core which was very difficult to knock out, a little wood-flour would help; but this addition reduced the hardness of the core, and made it a little more delicate and friable. Cores such as those for the axle-housing he had illustrated were not handled gently, but were likely to be knocked about, and to get a good casting finish one had to preserve the finish resulting from the surface of the corebox. If the cores were knocked or rubbed, one would get a poor finish on the casting.

MR. YOUNG asked if Mr. Tipper had heard any mention of industrial dermatitis arising from the use of CO_2 Process.

MR. TIPPER replied that he did not know of any. He had heard of one case of dermatitis having arisen in a foundry which used the CO_2 Process, but it was proved to have nothing to do with that Process.

Gas Supply

MR. J. P. P. JONES asked how many sources of supply of the gas there were, for it would seem that the situation would be rather dangerous if there were a monopoly, and a strike occurred.

MR. TIPPER said that, in addition to Carbon Dioxide Company, Limited, Imperial Chemical Industries, Limited, supplied solid CO_2. He would be interested to know whether any users had experienced any difficulty in getting supplies of gas. The foundries he knew best—in the Midlands—who were big users, usually carried adequate stocks of gas cylinders, and he understood they received very regular deliveries. One firm recently had installed a large liquid-CO_2 container, of the 1½-ton size, which meant that they had between one and two weeks supply of gas. Perhaps other sources of supply could be found, but apart from large industrial concerns who might have surplus gas he did not know any others who were supplying it at present.

Difficult Core Removal

MR. FRAZER said that at his foundry they were making by the CO_2 Process the cores for a 1½-ton housing casting and by doing so had cut core-making time, but it took half-an-hour extra to knock the casting out. The casting was of cast iron, about ½-in. section.

MR. TIPPER replied that, from his experience of castings of the sort mentioned and the type of sand mix that was used, the knock-out should not be at all difficult and he wondered whether there was any special circumstance arising. In his experience, when using pelleted pitch, and producing castings even thicker than that mentioned, weighing as much as ½-ton, core removal did not give rise to difficulty. In really difficult cases of core removal, pneumatic chisels could be used. However, he suggested that, if it were at all possible, Mr. Frazer should use only a shell of sand. He supposed the cores which were giving trouble were almost totally-enclosed cores.

MR. FRAZER agreed.

MR. TIPPER wondered whether it was possible to hollow out the cores, or whether they were already hollow. He also mentioned other addition agents which were being used, and suggested that Mr. Frazer might try wood-flour or sulphite-lye; there was no difficulty in getting these. There were still other additions, mostly types of carbon, which gave good results. Feeling that the cause of Mr. Frazer's trouble might be his basic mixture, he asked what sand was used. On learning that it was Redhill, he said this was a very suitable silica sand and quite honestly could not explain why difficulty was experienced; he would like to visit the foundry at some time.

Chilling Reported

MR. B. MALONE was very interested in the remark that, at the moment of gassing, there was a slight evolution of heat. He had found that more-effective gassing could be accomplished on very deep moulds and cores, by using gas pressures of the order of 100 lb. per sq. in. In his opinion, a reduction in mould temperatures was the result. This he had found influenced machinability of castings. A particular design of casting, prior to the advent of the CO_2 Process, had been made in stove-dried moulds, with no complaint. However, when the same design of casting was produced from a CO_2-Process mould, a fractured piece of an unmachined casting exhibited traces of surface chill—about $\frac{1}{32}$- to $\frac{1}{16}$-in. deep.

MR. TIPPER said the theory put forward was very interesting, and evidently Mr. Malone had some reason for suggesting it. If what he had said were correct, it could certainly be proved. It should be easy enough to check the Brinell hardness and the structure to see whether in fact there was increased surface hardness or whether there were symptoms of chilling. He himself had no experience of founders using the CO_2 Process and having difficulty with chilling and hard spots on their castings. If he had such experience, he would overcome it by an adjustment of the composition of the iron. In

most cases the higher thermal capacity of the mould seemed to be a help rather than a hindrance.

MR. MALONE said his was a controlled method of casting and there had been no previous machining difficulties, but the castings now exhibited surface hardness; in fact, a skin of hard metal. If the trouble was due to a cold mould, he asked what would be the result of putting that mould into a stove and warming it before casting.

Heat-conductivity of CO_2-Process Moulds

MR. TIPPER felt that the warming of the mould would have very little effect unless the temperature were raised 100 deg. F., or more; if that could be done, the initial chilling effect might be overcome. He asked if Mr. Malone had considered altering the metal composition.

MR. MALONE replied in the negative and said he was quite satisfied that the composition was correct for the casting in question.

MR. TIPPER said it seemed that the thermal conductivity or heat capacity of the mould was so much increased that the metal composition was brought too near the danger line (or maybe the composition was on the danger line anyway). Work which had been done by the Institute's technical sub-committees indicated that the rate of solidification and heat extraction could be increased by increasing (1) the density and (2) moisture content of a mould, and it appeared to him that in the case mentioned—using a CO_2-sand mould—they were doing something comparable with increasing the density of the mould. He wondered whether Mr. Malone had checked or altered the ramming density of the mould.

MR. MALONE replied that they had not done that knowingly.

MR. TIPPER said one of the theories connected with the Process was that it produced a moulding material having increased conductivity—that seemed to apply at certain temperatures, maybe near room temperature. What Mr. Malone suggested was that there was actually a temperature below room temperature in the mould. Frankly, he had never experienced that, and he suggested that Mr. Malone might check it by putting a thermometer into the mould.

Moisture the Cause ?

MR. J. F. CHAMBERS remarked that moisture had the tendency to speed up the solidification, and this might be the solution to the present question. He asked if Mr. Tipper could say how much moisture, either free or combined, there might be in the CO_2-sand mould.

MR. TIPPER said it was quite feasible to argue that moisture might be responsible for increasing the heat-capacity or thermal conductivity; it was known that moisture had a distinct chilling effect. The quantity of moisture present varied with the additions made to the sand; in a mixture which contained some clay-bonded sand, the moisture content of the sand as milled might be as high as 1 per cent. After gassing, it was probably reduced to somewhere between 0.2 and 0.5 per cent. In most moulds or cores, there was definitely a certain residual moisture content, and maybe that partially accounted for the chilling effect mentioned by Mr. Malone. The warming of the mould, as he had suggested, would reduce the moisture content and possibly would enable a satisfactory result to be achieved.

Contamination

MR. BURGESS asked if there were likely to be contamination in foundries of unit sands with CO_2-bonded sands, over a period of time.

MR. TIPPER said there was no doubt that contamination would occur over a period of time. Whether or not it was harmful was another matter; it depended on a number of things. If one were using CO_2-Process cores, making iron castings, then if a core were fairly well surrounded with metal it would not be dislodged at the knock-out; it would pass with the casting to wherever castings were cooled and the core would then be removed. If there was CO_2-Process sand in a mould it could not be prevented from entering the sand system, and lumps of sand were liable to form which should be removed by the screen. Unless the hard sand lumps were removed at this point, they would go through the sand reclamation system to the mill, and that was in fact something to be taken into account. Work was at present in progress involving the repeated use of CO_2-Process sand, checking carefully the effects of repeated casting into it, and so far there seemed to be no indication of trouble by way of deterioration of the surface-finish of the castings. The trial castings were in steel, but the work had not yet gone far enough to enable one to give a satisfactory answer to Mr. Burgess's question.

Interesting Possibility

DR. O. P. EINERL reported another interesting possible application of the CO_2 Process. If one used silicon-carbide powder instead of sand and set it with carbon-dioxide binder in a suitable metal corebox, one could produce a shaped chill. The heat conductivity of such chills was excellent—in many cases equal to a cast-iron chill.

A MEMBER recalled a reference in the Paper to the time of milling the sand and said that after milling he had found there was a tendency for the sand to stick to the pattern much more than it would when just mixed; he asked if Mr. Tipper agreed.

MR. TIPPER said that when he had to produce CO_2-bonded sand for a mould he preferred to mill it; where he wanted it for coremaking, mixing was suitable; both mill and mixer could be used very satisfactorily. Perhaps the speaker had used too much bond initially and was not getting it fully prepared in the mixer, and when he milled it he obtained better distribution and the sand was then stickier due to being " over-bonded." That was all he could suggest.

Vote of Thanks

MR. H. D. SPENCE, who proposed a vote of thanks to Mr. Tipper for his very interesting Paper,

Progress with the CO_2 Process—Discussion

said that a recent contribution by Mr. A. Talbot must have set a lot of people thinking about the CO_2 Process, not only for cores, but also for moulds; he did not think that foundrymen generally had realized the interest of the Process, but they were getting down to it now. One appreciated that it was likely to go a long way to increase the productivity of the foundry. The questions that had been raised at the meeting, he continued, were of exceptionally good standard. The interest aroused by Mr. Tipper's Paper was obvious and he felt that six or eight months hence there would be a big try-out of the scheme from the productivity point of view. He had enjoyed very much the excellent Paper, the film and the clear slides that were shown, and on behalf of all present he congratulated Mr. Tipper very heartily.

MR. E. HARWOOD BROWN said he took great pleasure in seconding the proposition, particularly for two reasons. The Paper and discussion had carried his mind back to the earlier days when the meetings of the Institute were primarily of a practical nature; Mr. Tipper had brought members back to practical considerations, in fact, to the "core" of things. Secondly, he had put forward something new, instead of the time-worn theories. It was the wish of all, he concluded, that a hearty vote of thanks be accorded to Mr. Tipper.

(The vote of thanks was carried with acclamation.)

MR. TIPPER, expressing his appreciation, said he had enjoyed addressing the London branch, and thought the questioners had let him off rather lightly. He had been concerned with the CO_2 Process over the last five years, and it was most encouraging to find such a great deal of interest now being shown. If there were any matters which the members had not had the opportunity to raise during the discussion, he would be pleased to help if they would write to him.

The meeting was closed after enthusiastic support had been given to a motion from MR. D. E. B. BARNARD, expressing the thanks of members to Mr. Faulkner for having presided.

Foundry Practices, by S. E. Rusinoff. Published by Technical Press, Limited, 1, Justice Walk, Lawrence Street, London, S.W.3; price 52s. net.

This American book is one of the few now available which gives a complete survey of the modern techniques (with the exception of the CO_2 process) involved in castings production. In the limited space of 260 pages and 14 chapters, patterns, mould materials, mould production equipment, the elementary metallurgy of cast alloys and physical testing, all are considered. A novel and most welcome feature is the inclusion of a complete section on "Safety in the Foundry." The complete survey which has been attempted has necessarily been accomplished at the expense of detail.

Much of the material is presented in somewhat colloquial fashion: "A good practice for brass castings is to rattle them in sawdust, or in a water charged tumbler" (page 179). "The alloys of nearly pure copper content . . . (page 194). Such phrases as these are ill-chosen and must detract from the value of the textbook. A number of questions suitable for review are listed at the end of each chapter; these are mainly intended for oral work and are of limited value. At least one such question "Explain the meaning of modular graphite," must surely be intended to baffle everyone or be capable of an extremely short answer! Few metallurgists will agree that "Pearlite is a cast iron manufactured by a German patented process in which iron of low silicon content is poured into heated moulds," or that "Mechanite" is the trade name of a patented cast iron. These errors are unfortunate in a book which lists no less than six individuals responsible for production.

Steels for the User, by R. T. Rolfe, O.B.E., F.R.I.C., F.I.M. Published by Chapman & Hall, Limited, 37, Essex Street, Strand, London, W.C.2; price 45s. net.

It came as no surprise to the reviewer that this book had reached its third edition, because it is written in language which the engineer can understand and covers a field which interests him. The lucid explanation of the iron-carbon diagram is commendable. The contents of the book are confined to plain-carbon steels, but an adequate amount of space has been given to the heat-treatment of steel castings. The new edition has been very thoroughly revised though, by and large, it is not a subject to which new knowledge is constantly being added, except by alloying, this phase only being covered in the cases of steels for high-temperature service and nitriding. The reviewer can unreservedly recommend the book to the people to whom it is addressed—the users of steel.

V. C. F.

Zinc and Light Metal Die-Casting. [A Report from a Commission after a visit to the USA.] Published by the European Productivity Agency of the Organization for European Economic Co-operation. Obtainable from Her Majesty's Stationery Office. Box 569, London, S.E.1; price 12s. 6d.

Because this report shows that the American approach to the manufacture of pressure-die-castings is much the same as to industry in general, it loses no interest thereby. Everybody in charge of a factory should by now know that it is not modern practice to allow heaps of semi-finished components to accumulate on the floor. Yet how often one sees this happening! The book contains five chapters, the last of which "management and labour" is not of great interest as each country has its traditional set up, which is difficult if not impossible to change. The other chapters. Die-casting Machines; Metallurgy; Foundry Practice and Finishing contain matter which is applicable to European practice. The report opens up with clear and unequivocal recommendations*—only too often these are relegated to the end. The book can be unreservedly recommended to all executives of pressure-die-casting shops.

Mechanical World Year Book, 1956; published by Emmott & Company, Limited, 31, King Street West, Manchester, 3; price 4s. 6d. net.

Whilst there has been commendable revision in the text of this useful reference book, it is suggested that the section covering cast iron should be amended to include the properties of the spheroidal-graphite variety in Tables III and IV.

Exports of Iron and Steel Goods

In order to ensure that scrap metal is retained in the United Kingdom, control is exercised over the export of certain iron and steel goods. In this connection the Board of Trade announces that the open general licence which authorizes the export of certain iron and steel goods valued at more than £25 per ton has been revoked and replaced by a new open general licence which raises this value limit to more than £35 per ton. This licence came into operation on February 15, and from that date individual licences will be required for exports where the value is £35 per ton or less.

The iron and steel goods are those specified in Group 6 (2) of the First Schedule to the Export of Goods (Control) (Consolidation) Order, 1955. Inquiries regarding the licence should be made to the Export Licensing Branch, Atlantic House, Holborn Viaduct, London, E.C.1 (telephone: CITy 5733). Copies of the open general licence may be obtained from HM Stationery Office. The licence does not apply to exports to China, Macao, North Viet Nam, or Tibet.

Clyde Machinery Contracts

Contracts for machinery costing more than £2,250,000 for the recently authorized extension at Meadowside Granary, Glasgow, are to be placed with two English companies by the Clyde Navigation Trust. Tenders for the machinery in the new building and for the pneumatic grain elevator discharging plant had been considered by the Joint New Works and Workshops Committees, whose recommendations were approved at the Trust's meeting on February 7.

Acceptance was recommended of the tenders of Simon Handling Engineers, Limited, Stockport, for machinery for the building, with quay high-level conveyor gantry, at three berths, at £1,561,495, and for three machines for the pneumatic grain elevator plant for ship discharge at £340,935; and of Spencer (Melksham), Limited, Melksham, for three machines for the same plant at £350,000.

Anglo Swedish Trade

Stockholm reports of an agreement concluded in London suggest that Anglo-Swedish trade in 1956 will in total approximate to that of last year, when Sweden's exports to Britain were somewhat larger than her imports. As Anglo-Swedish trade is mostly free, the negotiations mainly concerned those goods for which quotas still have to be fixed. For Swedish exports of iron and steel and engineering products satisfactory quotas are reported to have been secured, while increased quotas have been fixed for a number of goods. A new quota has been obtained for export of Swedish cars to Britain. As regards Swedish imports from Britain, there are contracts and potential contracts for 100,000 tons of iron and steel, including 40,000 tons of shipbuilding material and 20,000 tons of sheet steel.

James Clayton Prize

THE Institution of Mechanical Engineers has awarded the 1955 James Clayton prize to Dr. E. A. Watson for his notable work in automobile engineering and for his outstanding contributions in the last 15 years to the progress of the aircraft gas turbine, particularly in the fields of combustion and fuel control. These were the subjects of his James Clayton lecture in December.

Dr. Watson is a director of C.A.V., Limited, electrical and Diesel engineers, of London, W.3, Joseph Lucas, Limited, Joseph Lucas (Gas Turbine Equipment), Limited, and Rotax, Limited.

Pneumoconiosis Compensation Changes Urged

A SUGGESTION for new gradings for industrial compensation for pneumoconiosis is made by Dr. J. C. Gilson and Dr. P. Hugh-Jones in a report issued by the Medical Research Council. The two doctors, members of the council's pneumoconiosis research unit in South Wales, have made an investigation into the excessive breathlessness on exertion which is the principal symptom of the disease.

The present regulations for compensation, they say, require the man's loss of faculty from the disease to " be equated to the equivalent degree caused by other industrial injuries, such as the loss of a leg or finger, on a percentage basis.

" Since the objective measurement of breathlessness, the largest component of the whole assessment, cannot repeatedly be done in steps of less than 10 per cent., the requirement of a detection of 1 per cent. loss of faculty is unrealistic. In our view these difficulties could be lessened by using 20 per cent. as the lowest limit of recognizable disability, and thereafter recognizing only four grades of disability in steps of 20 per cent."

Gartsherrie Pig Iron Scheme

Extensive alterations and additions to the Gartsherrie Ironworks of Bairds & Scottish Steel, Limited, at Coatbridge will double production, increasing output of pig-iron from 150,000 tons to 350,000 tons a year. Preparatory work has been going on over the last four years, and one of its immediate results is that all grades of pig-iron will be machine cast. Early work to start in a few months includes the construction of a new blast furnace, which will replace furnaces of a smaller capacity and is the first of two modern blast furnaces for which provision is made in the new scheme. New ore stocking, screening, and sintering plants are also being installed and the battery of coke ovens is being doubled in size.

Associated Engineering Changes

REARRANGEMENT of the management of Associated Engineering Holdings, Limited, took effect on Wednesday. A management committee of the board has been formed under the chairmanship of Mr. N. C. Brearley, with Mr. E. Hepworth, Mr. F. P. L. Jackson, Mr. V. W. Oubridge, and Mr. A. J. Woolcott as members, for the purpose of co-ordinating the activities of the subsidiaries.

Mr. J. L. Hepworth has resigned from the Associated Engineering Holdings board and will continue as a senior executive director of Hepworth & Grandage, Limited. Mr. E. C. Ruffle has also resigned from the board and will shortly retire from the board of Wellworthy Piston Rings, Limited.

Capper Pass Awards

The Adjudicating Committee, representing the Councils of the Institution of Mining and Metallurgy and of the Institute of Metals, have made the following Capper Pass Awards in respect of papers published in 1955:—£100 to Dr. Maurice Cook, Mr. C. L. M. Cowley and Mr. E. R. Broadfield, for a paper on " The Use of Refractories in Low-frequency Induction Furnaces for Melting Copper Alloys "; £100 to Mr. P. M. J. Gray, for a paper on " Extraction of Uranium from a Pyritic Ore by Acid Pressure Leaching," and £50 to Mr. W. T. Edmunds and Mr. R. C. Lloyd, for a paper on " Production of Light-alloy Drop Forgings, Their Heat-treatment, Inspection and Testing."

Company News

BECK & COMPANY (METERS), LIMITED—CIC consent has been obtained to a four-for-five scrip issue to shareholders at March 14.

CHAS. HILL & SONS, LIMITED, ship builders and repairers, of Bristol—Application has been made to the London and Bristol stock exchanges for a quotation for the 310,000 6 per cent. £1 cumulative preference shares and the 660,000 £1 ordinary shares of the company.

BROOM & WADE, LIMITED, makers of air compressors, pneumatic tools, etc., of High Wycombe (Bucks)—In his review of the year ended September 30, the chairman, Mr. H. S. Broom, says that consolidated profit before tax, at £558,067, reached a new record and compared with £523,744 in the previous year.

SHANKS & COMPANY, LIMITED, sanitary engineers and ironfounders, of Barrhead, near Glasgow—For 1955 a final dividend of 10 per cent. makes a total of 15 per cent. on ordinary capital of £725,000. This makes an effective increase of 2½ per cent. on the 1954 total of 15 per cent., as the 5 per cent. interim was then paid on half the present capital before the 100 per cent. scrip issue.

CEMENTATION COMPANY, LIMITED—Arrangements are being made by the directors for the issue of an additional £250,000 5½ per cent. unsecured loan stock finally redeemed 1971-72 at a premium of 1 per cent. The stock will be placed privately. The new shares will be entitled to the full year's dividend for the year to March 31 next in which connection the directors expect the current dividend will be at the same rate.

MIDLAND IRON & HARDWARE COMPANY (CRADLEY HEATH), LIMITED—The final dividend is being raised from 23¾ per cent. previously to 30 per cent., making a total of 45 per cent., against 38¾ per cent., for the year ended July 31, 1955. The company announces the acquisition of the issued capital of Cradley Heath Manufacturing Company, Limited, tube fabricators, etc., for £80,000, to be satisfied by a cash payment of £40,000 and an issue of 200,000 1s. ordinary shares at a premium of 3s. per share. The final of 30 per cent. is payable on the new £10,000 capital.

GAS PURIFICATION & CHEMICAL COMPANY, LIMITED—The company announces a transaction by which it has, in effect, disposed of its interest in Daventry Engineering, Limited, a wholly owned subsidiary of Modern Engineering Machine Tools, Limited, as the Daventry concern is engaged in engineering sub-contracting in a form which the group does not wish to develop. The entire stockholding in Modern Engineering (formerly Modern Machine Tools, Limited, acquired under an offer of last July) has been disposed of at a price of 10s. per 5s. stock unit, it is stated, before which a new subsidiary was formed under the name of Modern Machine Tools, Limited, which has purchased from Modern Engineering all the assets required to carry on its business.

DARTMOUTH AUTO CASTINGS, LIMITED, Smethwick, have announced that their production of high-duty grey-iron castings for the motor and allied industries is now running at the high rate of 1,000 tons per week —an increase of more than three times the output of five years ago attained solely by improved planning and efficiency. To mark the occasion the directors entertained 120 members of the staff to a dinner at the Ward Arms Hotel, Dudley, on January 28.

Law Cases

Appeal to Lords Dismissed

RECENTLY the House of Lords dismissed the appeal of the Staveley Iron & Chemical Company, Limited, of Hollingwood, near Chesterfield, against a decision of the Court of Appeal that it must pay damages agreed at £333 16s. 2d. to a workman injured while helping to move a pan of iron cores at the foundry in 1951. The workman, Robert Jones, coremaker, of Crown Terrace, Worksop, had his right wrist trapped between the side of a pan which was being raised by a crane operated by Miss Bertha Howett (now Mrs. Burton) and the side of a railway truck.

Lord Tucker said Mr. Justice Sellers and Lord Justice Denning appeared to have thought that following the abolition of the defence of common employment there had been a change in the standard of care imposed upon master and servant with regard to acts done by a servant in the course of his employment. He did not share that view. He was of the opinion that negligence on the part of the crane driver, for which the company was responsible to Jones, was clearly established, on the evidence of its own witnesses.

The evidence showed that the crane driver lifted the pan straight up without taking the strain to see that the crane wire was vertical. He could not agree with Mr. Justice Sellers that that action was no more than an error of judgment. There was no evidence to suggest that Jones was guilty of contributory negligence or that his conduct fell below the standard required from a reasonably careful workman assisting in such an operation. The appeal should therefore be dismissed.

Lord Morton, Lord Porter, Lord Reid, and Lord Cohen agreed.

Foundry Company Fined £20

PLEADING Guilty to a contravention of the Factories Act, W. A. Baker & Company, Limited, engineers and ironfounders, of Newport (Mon), was fined £20 at Newport Magistrates' Court. The company admitted that it had not provided a safe means of access from a platform at its Westgate Works steelfoundry to a generating room, as a result of which one of its employees, Ivor Anstee, fractured his spine.

Mr. G. K. Wilbey, for HM Inspector of Factories, said a flight of concrete steps led down from the platform to the generating room. Anstee, an electrician's mate, was following an electrician down the steps when he stepped aside. There was no handrail and he fell to the floor, fracturing his spine. Anstee was off work for nine weeks.

Mr. H. G. Hughes, for the company, said that the firm had changed over from an iron to a steel foundry a few weeks before the accident. The company had intended making the steps safe and apologized for the accident.

Wages Higher in 1955

DURING 1955 the weekly wage bill rose by 7 per cent.—the largest increase for any year since 1951 —and about 12,000,000 workers won increases amounting to £5,000,000 a week. In 1954 slightly more than 10,000,000 workers gained increases of £3,500,000 a week.

Industrial disputes during the year lost 3,800,000 working days, which was the highest total since 1932. The "Ministry of Labour Gazette" reveals that altogether 670,000 workers were involved in stoppages. 1,690,000 working days being lost through the dock and railway strikes and 1,100,000 days in the coal-mining industry.

News in Brief

ALBERT COOK & SON, LIMITED, has submitted plans for the erection of an extension to the foundry at Wilcolmlee, Hull.

AINSBURY FOUNDRIES, LIMITED, Oldham, have had plans approved for internal improvements to their Sefton Street Works.

AN ORDER covering 300 two-pedal-control bus chassis has been placed with Leyland Motors, Limited, Lancs, by the Netherlands State Railways.

MARTONAIR, LIMITED, announce that with effect from February 1, Mr. Kenneth Friend has been appointed as technical representative in the Central London area, north of the Thames.

THE PLANS of Mr. D. E. Stuttard to develop a bakehouse near New Road, Hebden Bridge, as a small foundry have been approved by the Hebden Royd Urban District Council.

FIRE destroyed a works canteen at the foundry blacking works of William Cumming & Company, Limited, Old Whittington, Chesterfield. Firemen prevented the flames spreading to other nearby buildings.

THE STAND of Brooks Motors, Limited (No. F8), at the Electrical Engineers' Exhibition at Earls Court, will carry a full range of industrial motors up to 600 h.p., a wide selection of fractional-horse-power motors and a range of control gear.

EDGAR ALLEN & COMPANY, LIMITED, will include among their exhibits on stand No. 309, at the International Machine Tool Exhibition, Olympia, June 22 to July 6, a range of engineers' tools, permanent magnets, die steels, special tool steels and magnetic chucks.

BELARK TOOL & STAMPING COMPANY, LIMITED, 9, Carnaby Street, London, W.1, announce that it is issuing a monthly technical bulletin dealing with problems associated with the welding of aluminium. No. 1 has been issued and is available to readers on writing to Carnaby Street.

EMPLOYEES of Newton Chambers & Company, Limited, engineeers, Thorncliffe Works, Chapeltown, near Sheffield, responded so well to an appeal for a radio battery set for a blind man that there were 24 offered. A dozen offers were made within an hour of the appeal.

LAFARGE ALUMINOUS CEMENT COMPANY, LIMITED, sole manufacturers in the UK of "Ciment Fondu" aluminous cement, announce an undertaking that their prices will not be increased before June 30, 1956, whatever rise may take place in the interim costs outside their control.

STANTON IRONWORKS, LIMITED, Ilkeston, Derbyshire, report that they have received contracts worth £700,000 for iron pipes and fittings for new water schemes in India. They include contracts for the Governments of the Provinces of Andhra and Saurashtra and the Corporation of Madras.

IN RECENT WEEKS orders have been placed for over a dozen electric arc melting furnaces, each of more than a hundred short tons capacity. Of these, the majority are to be built by the Pittsburgh Lectromelt Furnace Corporation, whose licensees in this country are Birlec, Limited, Birmingham.

SIR ERNEST FIELD, director of the Scottish Engineering Employers' Association, recently presented prizes to the apprentices who were the winners of an essay competition organized by the Glasgow Productivity Committee The principal award, which was donated by Sir Ernest himself, was won by Angus Stuart (20), of G. & J. Weir, Limited, engineers, Glasgow.

A FOREMEN'S SOCIETY has been formed at the Davy & United Engineering Company, Limited, Darnall, Sheffield, with the aim of providing foremen with a broader view of all aspects of industrial administration. There are 54 members. An inaugural dinner was held at Cockayne's restaurant, Sheffield, on February 4, when Mr. Arthur Applewhite, chairman, presided.

THE METALLURGY (GENERAL) DIVISION of the British Iron and Steel Research Association are organizing a conference on heat-treatment practice, to be held at Ashorne Hill, Leamington Spa, on June 5 and 6. Emphasis will be given to the consideration of practical problems connected with the heat-treatment of steel products, from small engineering components to large forgings.

IMPERIAL CHEMICAL INDUSTRIES, LIMITED, announce a reduction in the price of their raw titanium to about 21s. (below $3) per lb. This compares with the current price of $3.45 in the USA—at present the largest producer and user of raw titanium. The reduction means that ICI is producing, by its new sodium process, titanium of the highest purity at what is now the lowest price in the world.

WOLVERHAMPTON DIE CASTING COMPANY, LIMITED, has acquired from Marston Excelsior, Limited, the Wolverhampton subsidiary of Imperial Chemical Industries, its factory premises in Paul Street, Wolverhampton. The factory has been acquired to enable the company to cope with the increased demands for its products and will enable manufacture to be more centralized and save considerable overhead charges.

THE BOARD OF TRADE have been advised that imported oil-burning apparatus should bear an indication of origin when offered for sale. The recommendation is contained in the report of the Standing Committee set up under the Merchandise Marks Act, 1926, and published on February 10, 1956, as Command No. 9686. Copies are obtainable price 6d., by post 8d., from H.M. Stationery Office, Kingsway, London, W.C.2.

THE EUROPEAN COAL AND STEEL COMMUNITY, now three and a half years old, reports that when international through rates are established after May 1 this year, coke will travel from the Ruhr (Gelsenkirchen) at 4.45 dollars per ton, compared with 6.53 before the common market was opened; coal from Saar (Reden) to Germany (Regensburg) will be transported at 6.55 dollars against 8.92, and iron ore from Sancy in Lorraine to Liège in Belgium at 1.70 against 2.38 dollars per ton.

OVER-PUBLICITY OF AUTOMATION is tending to create industrial fear, Mr. O. D. Smith, chairman and managing director of the Maudsley Motor Company, Limited, told the Junior Institution of Engineers in Birmingham recently. Automation was but a new word for the old process of mechanization, he said. Mr. Smith attacked the idea that a magic wand is about to be waved over the country; he was confident that the developments now being labelled as automation would never replace the art of engineering.

THE TEXT of an Eire Republic parliamentary Bill which will give a Canadian mining syndicate tax concessions in developing Avoca (Co. Wicklow) copper mines was issued recently. The Bill provides for complete income tax relief for five years and for relief of one half of the corresponding tax for the succeeding three years. Full relief from Corporation Profits Tax is granted for the first 48 months of operation and for the second 48 months' mining operation the relief granted by the Bill is from half the tax.

Personal

DR. S. F. DOREY, C.B.E., WH.EX., F.R.S., has been elected an honorary member of the Institution of Mechanical Engineers.

MR. E. NEVILLE DUFFIELD of the Yorkshire Copper Works, Limited, has resigned both his post with the firm and his seat on the board on the grounds of ill-health.

Sir JOHN CRAIG has relinquished the chairmanship of Smith & McLean, Limited, Glasgow, a subsidiary of Colvilles, Limited, and Mr. HAARY YATES has been appointed to succeed him.

MR. R. C. RHODES, lately works manager for William Doxford & Sons, Limited, shipbuilders and marine engineers, Sunderland, has been appointed managing director of Anderson's Insulation Company, Limited, Liverpool

Mr. S. COOPER has been appointed works manager of J. & H. McLaren, Limited, engineers, of Leeds, in succession to Mr. B. R. CANT, who is leaving to become general works manager of the National Gas & Oil Engine Company, Limited, Ashton-under-Lyne, which is also a member of the Brush Group.

MR. D. TORBET has resigned from the secretaryship of the North East section of the Scottish branch of the Institute of British Foundrymen consequent upon the acceptance of a post in the Bristol area. MR. H. CONACHER, of Montrose Foundry Company, Limited, has taken over the secretarial duties on a temporary basis, for the time being.

Mr. S. B. HAINSWORTH, managing director of J. H. Fenner & Company, Limited, conveyor belt manufacturers, etc., of Hull, and J. H. Fenner & Company (Overseas), Limited, is now on his way to India where he hopes to be present on the occasion of the commencement of operations of Fenner-Cockill, Limited, a new company set up in southern India.

Metal Industries, Limited, Glasgow, announce that Mr. J. S. HUTCHISON has resigned office as chairman of the company, and that Mr. J. L. HARDIE has resigned from the board. Sir CHARLES WESTLAKE has been appointed chairman. Sir Charles, who was knighted in 1954, joined the board last year. He was formerly chairman of the Uganda Electricity Board.

SIR BEN LOCKSPEISER, K.C.B., F.R.S., will be retiring from the post of secretary to the Committee of the Privy Council for Scientific and Industrial Research on March 10. PROFESSOR H. W. MELVILLE, F.R.S., who is now Mason Professor of Chemistry at the University of Birmingham, has been appointed to this position. He will take up his new appointment in August.

The Northern Regional Council of the Federation of British Industries has elected as its chairman Mr. J. ERIC STEEL, chairman and managing director of Steel & Company, Limited, engineers, of Sunderland. He succeeds Col. E. G. ANGUS, chairman and managing director of George Angus & Company, Limited, power transmission engineers, of Newcastle-upon-Tyne.

MR. PATRICK DAVIS, who has been appointed to the board of Smith & Davis, Limited, the Wednesbury brassfounders, is the younger son of the company's chairman, MR. F. LEONARD DAVIS. His appointment means that the third generation of both founder families of the firm are now board members, MR. H. HOWARD SMITH having become a director three years ago.

MR. AMBROSE FIRTH, chairman and managing director of the Brightside Heating & Engineering Company, Limited, presented to Mr. William B. James, a director and Birmingham branch manager of the firm, a long service certificate on January 31, when a dinner was held in Birmingham to commemorate his completion of 40 years' service with the firm. Mr. James was also presented with a cocktail cabinet and cut glass to which employees of the firm had subscribed.

The managing director of the Brush Group, Limited, Mr. MILES BEEVOR, left London on Thursday of last week on a 20,000-mile tour of Egypt, Ceylon, India, and Pakistan. On the eve of his departure he announced that two export orders totalling £610,000 had been obtained by Brush Export, Limited, from the Ceylon Government department of electrical undertakings for extending and equipping the power station at Pettah, Colombo, and for equipping a new power station at Jaffna.

The Institution of Mechanical Engineers has appointed Mr. K. H. PLATT as deputy secretary and Mr. FRANK H. HEARN as assistant secretary. Mr. Hearn is a former honorary secretary of the East Midlands branch of the institution and previously served as education officer of the English Electric Company, Limited, and of the Brush Electrical Engineering Company, Limited, where he was also chief personnel officer. He is a former lecturer in mechanical engineering at the School of Mines, Treforest (Glam).

Obituary

The death has occurred of Mr. THOMAS THOMAS, head of Thomas Thomas & Company (Est. 1919), Limited, iron and steel merchants, of Middlesbrough. He was 69.

Mr. THOMAS AUBREY POOL, chairman of J. & F. Pool, Limited, makers of metal perforators and quarry plant, wire weavers, etc., of Hayle (Cornwall), has died at the age of 77.

MR. WALTER BRYDEN, J.P., who was for many years warehouse and shipping department foreman at the Columbian Stove Works, Bonnybridge, has died at the age of 75.

The death has occurred of CAPTAIN A. W. BOWEN, managing director of A. Bowen & Son (Crumlin), Limited, one of the oldest brass foundries in Monmouthshire.

MR. A. M. VASS, of the Consolidated Pneumatic Tool Company's works at Fraserburgh, died suddenly in Aberdeen Royal Infirmary on January 31. He joined the company in 1924 and succeeded his father, Mr. J. U. Vass, as works manager in 1949.

Mr. STANLEY WRIGHT PEARSON, manager of the Templeborough melting shop of the Steel, Peech & Tozer branch of the United Steel Companies, Limited, has died at the age of 56. Mr. Pearson had worked for the company since leaving school and was shift chemist in the Rotherham melting shop before going into the works metallurgical department.

Dr. E. C. S. MEGAW, chief officer in the Royal Naval Scientific Service, has died at the age of 48. In 1930 he joined the research laboratories of the General Electric Company, Limited, working for 16 years under the late Sir Clifford Paterson. In 1933 he was awarded the Duddell premium of the Institution of Electrical Engineers for his work on methods of generating very short radio waves